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The More You Know:

Linkage of Public Health Datasets and All-Payer Claims to Further Population-Level Opioid Research

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Background

- The opioid epidemic persists
- Fewer overdoses involve prescriptions written to the patient; more are non-medical use or illicit opioids (fentanyl, heroin)
- Does someone's home address affect their overdose risk?
  - Do household members affect overdose risk?
  - Does community/neighborhood affect overdose risk?

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Background

- Population-level opioid research using administrative data is good, but often limited
  - Breadth or depth
  - Restricted to a subset of a population (e.g. single payer type)
  - Restricted to a subset of records (e.g. paid pharmacy claims)

- **Our objective was to link, at an individual patient level, public health datasets with all-payer claims and census data**
  - Create rich administrative dataset
  - Enable multifaceted approach to assess prescription opioid risk

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Team

- Principal Investigator: Scott Weiner, MD, MPH, Brigham and Women's Hospital

BRIGHAM HEALTH
BWH BRIGHAM AND WOMEN'S HOSPITAL

Brandeis University

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Partner:
Oregon Health Authority

McLean HOSPITAL
HARVARD MEDICAL SCHOOL AFFILIATE

Funding

- NIH/NIDA 1-R01-DA044167-01A1
  - PAR 16-234: Accelerating the Pace of Drug Abuse Research Using Existing Data (R01)

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Approach

- Linkage of administrative datasets
  - Oregon's voluntary multipayer claims data (Oregon Data Collaborative)
  - Prescription drug monitoring program (PDMP)
  - Vital records (death certificate data)
  - Hospital discharge data (state registry)
  - Emergency medical services (ambulance response data)
  - Census data
- Hierarchical logistic modeling to test each aim

Aims

1. Model interaction effects between patient-level risk factors, including patient demographic, clinical characteristics and patient prescription patterns on opioid-involved overdose
2. Determine the effects of household-level prescription availability on opioid overdose
3. Determine the effect of community-level prescription availability on opioid overdose
4. Validate findings in Utah to test generalizability of Oregon results

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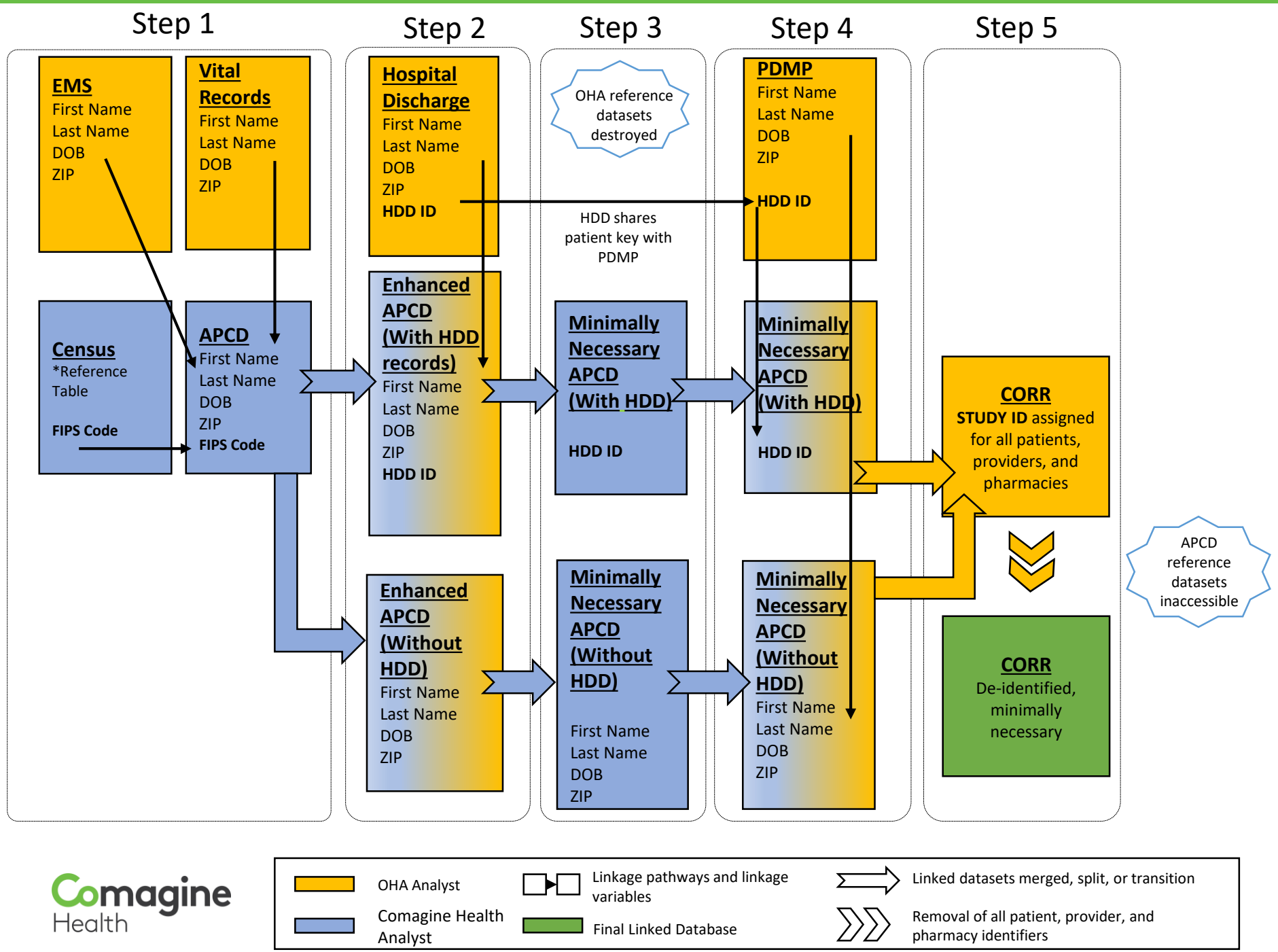
Step 1
Step 2
Step 3
Step 4
Step 5
EMS
First Name
Last Name
DOB
ZIP
Vital Records
First Name
Last Name
DOB
ZIP
Hospital Discharge
First Name
Last Name
DOB
ZIP
HDD ID
OHA reference datasets destroyed
PDMP
First Name
Last Name
DOB
ZIP
HDD ID
HDD shares patient key with PDMP
Census
*Reference Table
FIPS Code
APCD
First Name
Last Name
DOB
ZIP
FIPS Code
Enhanced APCD (With HDD records)
First Name
Last Name
DOB
ZIP
HDD ID
Minimally Necessary APCD (With HDD)
HDD ID
Minimally Necessary APCD (With HDD)
HDD ID
CORR
STUDY ID assigned for all patients, providers, and pharmacies
APCD reference datasets inaccessible
Enhanced APCD (Without HDD)
First Name
Last Name
DOB
ZIP
Minimally Necessary APCD (Without HDD)
First Name
Last Name
DOB
ZIP
Minimally Necessary APCD (Without HDD)
First Name
Last Name
DOB
ZIP
CORR
De-identified, minimally necessary
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OHA Analyst
Comagine Health Analyst
Linkage pathways and linkage variables
Final Linked Database
Linked datasets merged, split, or transition
Removal of all patient, provider, and pharmacy identifiers

Details

- Linkage
  - *FastLink* run in R
  - Probabilistic linkage using name, DOB, ZIP code
  - Efficiently links and de-duplicates people in very large administrative datasets
- Household grouper (Aim 2)
  - Unique patients linked with household members in 12-month periods (April-March)
  - Uses exact address, P.O. Box, apartment number, etc.
  - Create unique ID for every household in each 12-month period

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Details

- Community identifier (Aim 3)
  - Code in R runs a cyclical process
    - Submits exact address to census website
    - Converts address to latitude, longitude and FIPS code
  - Resulting output is dataset with patient ID, address, latitude, longitude and FIPS code
  - FIPS code used to pull in census tract community characteristics from census data for each person in APCD cohort

Significance

- Population-level data linkage requires substantial preparation and cleaning
- Linked datasets provide valuable information
  - Prescription and clinical history across payers with other factors predictive of overdose, and best capture of overdose events
- Other states could replicate our methodology to create a state-specific CORR

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Thank you!

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